



**Southeast Alaska Climate Change Scenario Planning
Workshop
February 21-24, 2012**

Mendenhall Glacier Visitors' Center, Juneau Alaska
Glacier Bay-- Klondike--Sitka--Wrangell-St. Elias



Lead team [*inland group*] and [*marine group*]

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John Morris: Interpretation-NPS Regional Office

Nancy Fresco: SNAP

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Don Calloway: NPS Cultural Anthropologist (retired)

Don Weeks: NPS Climate change resource coordinator in Colorado

Participants

Susan Kasinger: WCA tribe

Lisa Etherington: Chief of Resources, Glacier Bay NP

Tahzay Jones: NPS AKRO Coastal Resources

Pat Warren: Environmental Planner, Chilkat Indian Village

Kris Nemeth: Chief of Interpretation at Glacier Bay NP

MaryAnn Porter: Yakutat Tribal Environmental Coordinator

Randy Larson: Sitka Superintendent

Cassie Hauser: MS student in TN

Greg Killinger: Fish/water/soils in Tongass NF

Mike Goldstein: AK coastal rainforest center/USFS/vulnerability

Susan Boudreau: Superintendent at Glacier Bay

Jim Thomas: regional planner for USFS in Juneau

Chris Sargeant: SE NPS

Brandon Moynahan: data collection for SE

Steve Gray: USGS Climate Science Center

Leilani Knight-McQueen: Tlingit Cultural Director

Raymond Paddock: Tlingit council-education and youth outreach

Corrie Knapp: UAF graduate student

Eric Veach, Chief of Resources, Wrangell-St Elias NP

Miranda Terwilliger – NPS, Wrangell-St Elias National Park

Barbara Schrader – USFS

Jessica Wilbarger – NPS, Klondike Gold Rush NHP

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Project Goals

The goal is to educate, build capacity, process and develop scenarios for climate change planning in SE Alaska. Products will include a report with recommendations; we have no authority to tell NPS what to do. This exercise is concentrating on climate rather than weather, meaning average conditions over long periods of time.

DAY ONE

Introduction to Scenario Planning

Climate change is already occurring in Alaska. We can no longer manage for old goals and priorities that assume a static climate. Collaboration and knowledge sharing are necessary. The role of SNAP (the Scenarios Network for Alaska and Arctic Planning) is to connect planners and other individuals with data, in order to provide useful advice about adaptation to climate change. SNAP uses models to answer questions people are asking.

Unlike forecasting, scenario planning emphasizes multiple believable and plausible scenarios (Figure 1). These scenarios should be selected to be:

- Relevant
- Plausible
- Divergent
- Challenging

Scenario planning, as outlined by Global Business Network (GBN) has been used successfully by corporations and non-profits. This planning process asks participants to orient on

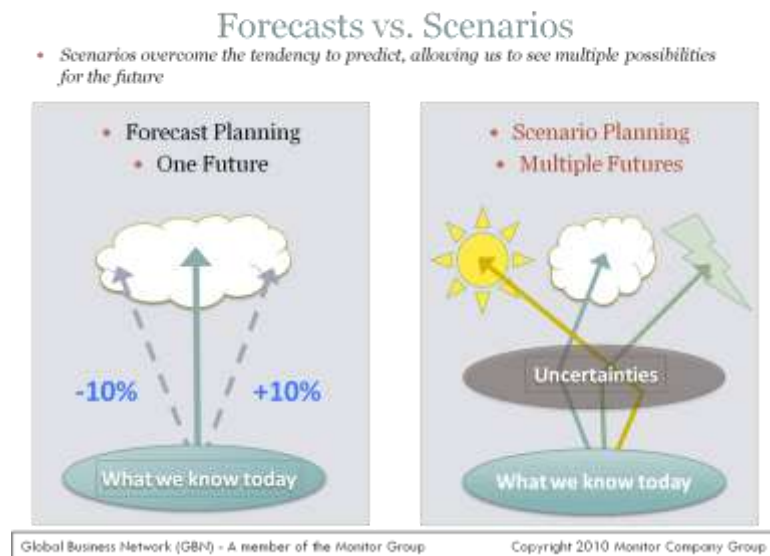


Figure 1 – The difference between forecasting and scenario planning. (courtesy of GBN)

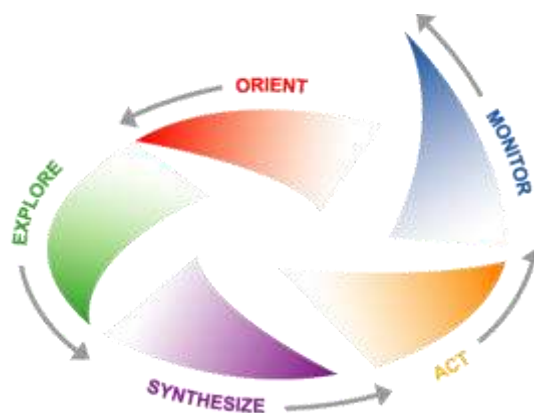


Figure 2 – The cycle of scenario planning. (courtesy of GBN)

a focal question, explore and synthesize potential scenarios, base actions on these potential outcomes, and monitor the results of these actions (Figure 2). The latter two steps will occur after the workshop.

Focal question: How can NPS preserve natural/cultural resources in the face of climate change?

[Note that although parks are the focus, other perspectives are also important.]

The first task is to select **critical forces** with high impact and high uncertainty. Next we will use two climate drivers to

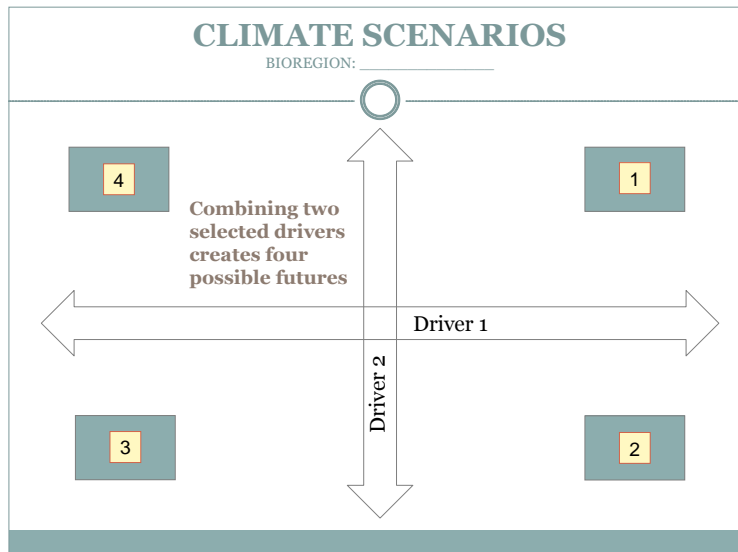


Figure 3 – The primary scenarios framework. Each driver has a range, as indicated by the arrows.

Scientific Background

Climate Drivers

The first planning step is to select drivers with high impact and high uncertainty. It is also important to consider whether drivers have a wide range of effects, impacts in all parks, and impact multiple sectors.

Drivers can be more general (e.g. temperature change) or more specific (e.g. water temperature).

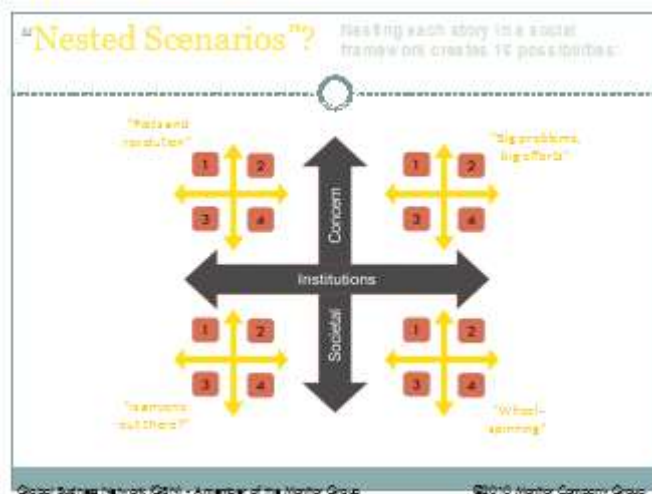


Figure 4 – The nested scenarios framework. All 4 primary scenarios can occur in any one of 4 sociopolitical futures.

- Temperature, precipitation and linked variables are projected by SNAP model data.
- The Pacific Decadal Oscillation (PDO) is a wildcard variable that can exaggerate or dampen underlying change.
- Ocean Acidification may lead to reduced survival of algae and plankton, and a huge impact on food webs. Threshold is unclear.
- Sea Level is actually

- declining due to glacial rebound.
- Effects of storm surges are unclear.
- In selecting drivers, there is no need to ignore changes with greater certainty. These can be integrated into scenarios based on more uncertain drivers.

Climate effects

Results of our pre-workshop survey (27 participants) emphasized the importance of a range of effects, including air temperature, ocean acidification, shrinking glaciers, ecological tipping points, impacts to salmon, other species losses, structural damage, social and cultural losses, and impacts to subsistence.

[At this point, workshop participants divided into two groups for breakout sessions: the Marine Group and the Inland Group]

Marine Group:

This group's assessment of the importance and uncertainty of selected drivers can be seen in Table 1.

Table 1 – Driver assessment, Marine Group. The group omitted some drivers off that aren't marine.

	High Uncertainty	High Confidence	High Impact
Temperature		X	X
Form: Rain & Snow (changed)	X		X
Timing and magnitude of stream flow (added)	X		X
Freeze up date		X	
Length of growing season		X	X
River/stream temperatures		X	X
Sea Level rise		X	(rebound?)
Water availability (soil moisture)	X		
Relative humidity	X		
Wind speed		X	X
PDO	X		X
Extreme: Higher Temps		X	X
Extreme: Precipitation	X		X
Extreme: Storm	X		X
Ocean temperature increasing(added)		X (but not degree)	X
Ocean Acidification (added)		X	X

The group discussed details of drivers, including the following:

- Timing and magnitude of stream flow

What are the ends/extremes, and how can changes in timing and seasonality be described in terms of end points?

- Ocean Acidification

Group wasn't certain about the impacts, but defined the range as a change of $-.01$ pH to $-.04$ pH

- Extreme Events: Storms

Low: little change in frequency/magnitude, High: significant/high increase in frequency and magnitude

- PDO

Effects on ocean temperature; socio-political importance; timing and uncertainty

- Ocean Temperature
- Extreme Events: Precipitation
- Ocean currents or upwelling

Inland Group

The Inland group assessed the drivers as follows:

High uncertainty:

1. Extreme Events – Precipitation – **important**
2. Extreme Events – Storms – **important**
3. Precipitation
4. Water availability – changed to “seasonality of water flow”
5. PDO – certain that it does occur, but timing is highly uncertain

Relatively certain (any of these could be chosen as an assumption):

- Increased temperature – **important**
- Increased growing season – **important**
- Increased length of ice-free season – **important**
- Extreme Events – Temperature – **important**

New Driver:

- Seasonality of water flow – high uncertainty, **important**

Next, the group selected the top three drivers:

1. Seasonality of water flow
2. PDO
3. Precipitation and storms

They opted to consider PDO an amplifier instead of a driver, thus choosing the following two drivers with end points as noted:

1. $-20\% \leftarrow$ Extreme Weather Events (storms/precipitation) $\rightarrow +50\%$
2. Historical flow/timing \leftarrow Seasonality of Water Flow \rightarrow “abnormal flow/timing”

DAY TWO

Insights/Ideas

- Every park will be different—different critical drivers
- Hope to reinvent in smaller communities
- Need to put some on hold—integrate them later on
- Drivers terrestrial/marine are similar—but different scenarios
- Divergence is really important—to be able to see possibilities
- Yesterday a lot of science—still trying to think about relevance

Marine Group:

This group still had not selected two drivers, so tried several matrices:

- Stream flow x Ocean acidification
 - Stream flow = challenge because not well defined
 - Stream flow = can these local effects/impacts not be captured at this scale?
- Ocean acidification x Extreme storm events
- PDO x Ocean acidification
 - Concern that didn't really know how much about PDO or its impacts

Ultimately decided to cross **Stream flow x Ocean acidification** (Figure 5).

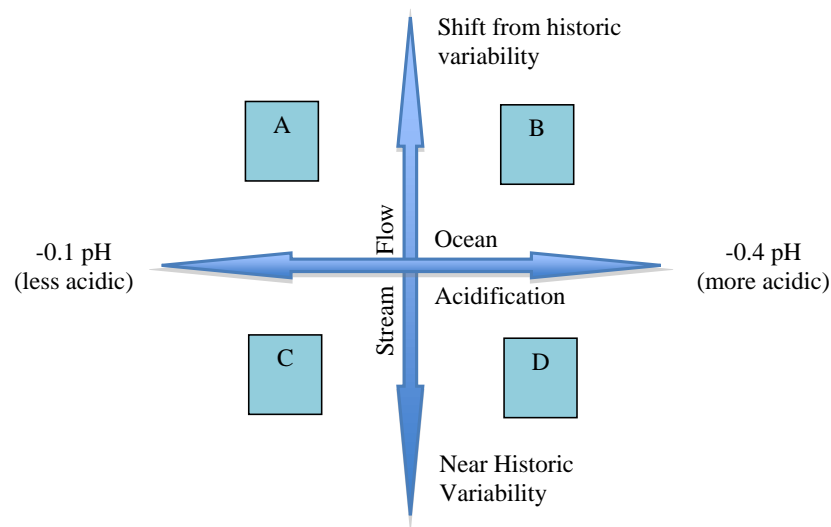


Figure 5 - Primary Matrix, Marine group. Selecting two primary drivers creates four biophysical scenarios.

From this, four scenarios emerged:

A = low acidification + high shift in natural stream flow (+ cool PDO) = “Cluster Flood”

- Biological
 - mismatch with life stage events (recruitment/spawning)

- Different volumes of water/different times
 - Salmon coming up, smolts missing bloom
 - Decrease in overall productivity
- Social/Cultural
 - Can't assume same fishing patterns—increase in turbidity
 - People may move to cities because they cannot depend on resources
 - Potential for higher flooding-safety issue
 - Loss of cultural resources
 - Impact on rafting companies
- Infrastructure
 - Need to build new bridges
 - Erosion of trails
 - Less stable hydropower potential
- Glaciated:
 - Glacial dams bursting—increase in flash floods
 - Broaden the flow—more spring and fall—whole magnitude may raise in the middle
 - Longer periods of turbid water-decrease the productivity
 - More flow later in the year
- Non-glaciated:
 - Less high peak in the spring
 - Lower summer flow
 - Higher fall flow b/c of greater rains
 - Flow later in the year
- Temperature (cool/warm) has a huge impact—warm—lots of different animals, cool (snowpack to protect plants)
- Freshwater—stratification patterns. Reduction in melt—lower plankton blooms
- Herring other fish—more variability—can't recover from a crash
- Most of SE parks are heavily glaciated—do we need to focus on this?
- PDO off for A (masking acidification-dampen variability), on for C (high acidification)—look at compounding events.
- PDO
 - Greater impact on temperature than precipitation
 - Cold PDO: masking, more similar to historical, moderated stream flow, higher salmon, more snow, more productive
 - Warm PDO: less advantage for productivity, more rain, more flashy events, drying of system, increase in fire frequency
- Another thing to toggle: uncertainty/variability—simplifying habitat
- Defining stream flow end points:
 - Change about the mean of peak flow
 - Higher or lower variability from the current hydrograph
 - Difference between glacial/non-glacial systems

B = high acidification + high shift in natural stream flow = “Bad News”

- Increase in invasives
- Reduction in salmon and fish

- Loss of food web diversity
- Decrease in land/marine mammals, birds
- Loss in habitat structure
- Increase in disease
- Cultural losses
- Social pathology increase (commercial, tax base, culture, tourism decrease)
- Stranding of marine mammals

C = high acidification + status quo in stream flow = “Trying to do more with less”

- Higher acidification is driving the scenario
- Lower ocean productivity
- Less fish available
- More competition for fewer resources
- Decrease in sound absorption (noisier)
 - Change management of cruise ships
 - Larger impact on marine mammals
- Decrease in large mammals
- Increase in desire for subsistence in NPS
- Gradual and difficult to see = lack of awareness/delayed perception
- Change in bird populations
- Loss in habitat complexity—shellfish impact
- Visitation might be stable—bigger cruise ships

D = low acidification + status quo in stream flow = “Acceptable losses”

- Moderate reduction in salmon and smaller biomass
- More variable in effects—less predictable
- Shift in available food—all marine populations
- Lower carrying capacity for all life forms—less life

Inland Group:

Crossing extreme Events (weather, storms, precip) x Seasonality of Water Flow produced the matrix shown in Figure 6.

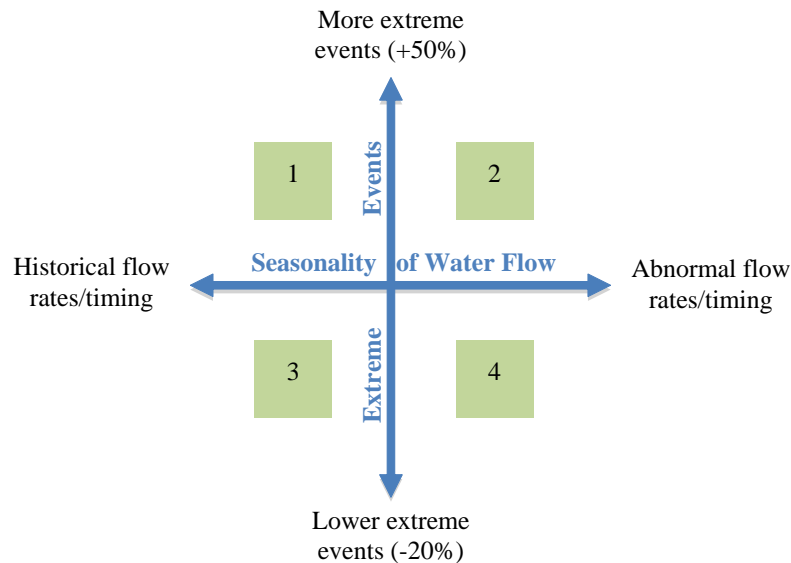


Figure 6 – Primary Matrix, Inland group. Selecting two primary drivers creates four biophysical scenarios.

Four Emergent Scenarios

1 = historical flow rates/timing + higher extreme events = “Yo-yo Snow & Blow”

- Episodic events = reduced resources
- floods
- forest blowdown
- Extreme **fluctuation** in fisheries/wildlife – depends on species = which are able to adapt? Some might flourish or become more stable? (Fluctuation vs destruction)
- More snow = deer die off? But then recover in subsequent years.
- Big flood = wipes out salmon, invertebrates. But then recover in subsequent years.
- Structural damage to facilities/infrastructure (historical/cultural)
- Transportation disruptions
- Heavier snowfall events (=avalanches) – large snow loads & blizzards
- Heavier rainfall events (=floods)
- More snow = grows glaciers at higher elevations? – not really “stable”, rather continued retreat of lower elevation glaciers while upper elevation glaciers get thicker (as temperatures increase, warmer air masses bring more moisture = more snow at higher elevation, more rain at lower elevations)
- More snow = more successful small rodents (subnivian)

- Slight increases in river and stream temps
- Salmon population unaffected
- Little opportunity for human adaptation (too yo-yo)
- Less focus on preservation and health bc people too focused on responding to immediate disasters (compared with “ID crisis”)

2 = abnormal flow rates/timing + much more extreme events (+50%) = “Disaster Zone”

- natural disasters/catastrophic events more frequent
- floods
- fire – highest fire risk of 4 quadrants
- drought
- glacial dams fail or develop
- landslides
- avalanches
- blizzards
- earthquakes
- forest pests
- forest blowout
- riverbank erosion (with trees getting cut down)
- water availability affected
- tourism affected
- movement or loss of species/migration affected
- berries affected -> which affects bears
- River and stream temps
- Drastic loss of salmon – local extinction

3 = historical flow rates/timing + lower extreme events (-20%) = “Calm Before the Storm”

- calm/moderate weather
- people attracted to area = more visitors/tourism
- increase in invasive species (species move north and up in altitude)
- glacial retreat continues
- more conflicts for use of resources
- increased tourism = economic boost
- Slight increases in river and stream temps
- Salmon population unaffected
- More opportunity for human adaptation as changes happen at a more steady pace

4 = abnormal water flow rates/timing + less extreme events (-20%) = “SE Identity Crisis”

- flooding

- drought
- disrupted fisheries
- glacial loss/gone at lower elevations
- coastal salinity issues
- habitat change, food availability
- Increased coastal access, more fjords
- Vegetation and wildlife changes --- changes may be slow and steady ---habitat shifts of *mobile* species. Shift in species composition.
- Yellow cedar die
- Subnivian animals decline
- More fire
- Vegetation migration from south
- Wetlands impacted
- Riverbank erosion, houses lost
- Watershed loss -> cisterns, small ponds
- Insects and disease
- Ecological tipping point
- Decreased tourism or shift to Hubbard?
- Different marketing?
- Change is more predictable

General assumptions/certainties for all quadrants:

- Warmer (may be either dampened or amplified by the PDO)
- Slight increases in precipitation (5-16% for SEAN parks based on SNAP projections)
- PDO fluctuations

Other considerations:

- PDO damping, then amplifying the effect of climate change.
- River and stream temperatures increase, but glacial feeding could make temperatures decrease. Also affects nutrient influx. → taken out of general assumptions, but make sure to emphasize this in each of the quadrants.
- What about glacier response?? (Kris) A: Depends on: Marine proximity, Elevation of the glacier, whether it is a tidewater glacier (Bud)

As glaciers retreat, several things could happen:

- New species (veg and animal) move into newly vacated areas
- Could open new routes that were previously uncrossable

Social and Institutional Drivers

How do we organize ourselves to adapt to the changes that are coming? Some examples:

- Kivalina
 - Fluctuation in subsistence use by year/availability
- Deering
 - Subsistence = function as community—not as individuals, *cultural core* for native communities
 - Profound adaptation
- Buckland
 - Sharing networks could be destroyed if need to be moved
 - Exxon-Valdez heightened friction when decision-making authority taken away
- Newtok
 - Less sea ice—more intense storms off open sea
 - Challenge to deliver fuel—waste disposal, flooding of water sources
 - Challenge of coordinating institutions—no central organization
 - Total cost to relocate Newtok = \$50-100 million

Summary

- Bureaucracy: Institutions present serious obstacles to adaptation.
- Federal planning as “random acts of kindness”
- Relocation – 180 other communities need to relocate.
- What is the impact on cost of living, culture and sharing networks?

Nested Scenarios

Each working group:

1. Places developed scenarios into crossed matrices: Degree of Societal Concern x Nature of Leadership (Figure 7)
2. Fleshes out 2-3 scenarios within a sociopolitical context
3. Develops narratives of what the world looks like for these scenarios to present a “story” rather than list of details.

Marine Group

1. Bad News in Big Problems/Big Solutions

- High effort to green operations—green certification
- Climate-tours increase
- Federal capacity focused on FDR approach—restore fish habitat/aquaculture
- Increase outreach programs with personal perspective—build awareness and take advantage.
- Collaborative efforts are the status quo—more efficient and landscape scale mgmt
- High focus on community participation

- Increase hydropower efforts

2. **Chaos in Riots & Revolution: Grassroots Recovery**

- Community growth—smaller communities relocate
- Resource abundance really unpredictable—economic impacts
- Fuel scarcity and increased cost
- Rely more on imports (fuel/food)
- More marine protected areas and focus on renewables
- Demand for adaptive co-mgmt
- Increase in global water demand (opportunity)
- Invasives up

Describe this world in 2030:

- Development pressure in bigger cities—loss of rural community membership, higher gas prices
- More competition for fishing resources
- Boom and bust of resources (unpredictable resources)
- Increase in restricted areas—more critical habitats
- Reliance on outside imports—increase food costs
- Creating more marine protected areas
- Pursuit of alternative energy (tide/air power)
- Loss of identity, self-reliance and sense of intact community
- Increase in restoration efforts
- Increase demand for co-management
- Global water demand is up
- Potential coastal management plan
- Increased mineral/energy development
- Increase in invasives

Major Impacts to the Bioregion:

- Loss of history and sense of pride/tradition
- Loss of communities in general
- Decreased habitat quality
- Seasonal tourism less predictable (Change in traditional recreation opportunities)
- Flooding and erosion increase—may influence habitat

Implications for Management:

- Need for restoration
- Increase in hatcheries/aquaculture—potential loss in income (not wild caught)
- Increase in lawsuits
- Increase in demand for adaptive co-management
- Planning needs to account for threat to infrastructure
- Conflict in mandates
- Increase in maintenance costs—how to prioritize limited resources
- Dated policy and mandates-increased rigidity
- Need for increased landscape and international management

- Need for coordinating agency
- Subsistence Vs. tourism-increased visitation
- Increase in resource extraction management
- Increased visitation
- Increase in civil disobedience
- Increase in emergency response
- How to assign value and prioritize?
- How to keep up with research needs?—scenario planning needs continual updating/revision
- New technologies—access/use/etc...
- Funding to respond
- Monitoring needs, but no funding

Terrestrial Group:

1. Southeast Identity Crisis in Is Anyone Out There?

Describe this world in 2030:

Political/Social/Economic:

- What's happening now will continue. No major disasters, and no one can directly link these changes to climate change. Our political atmosphere will continue, i.e. competing concerns.
- Big economic drivers could make climate change drop out of the picture... other political concerns overshadow concerns of climate change.
- Thrust for smaller gov't continues. Agencies are not funded to deal with issues lower than national security. Some agencies dissolved.
- Increased corporate control. Corporate influence increases. Multinational corporations are the dominant interest in local communities.
- With great corporation influence and less federal influence, communities will be more responsible for social services (including environmental issues)?
- Corporations in SEAN specifically = logging (biofuels), tourism, fisheries, mining.
- Adaptation is not happening (Is Anyone Out There?)
- Higher fuel costs and less ability to supply

Major Impacts on the Bioregion:

- Increasing temperatures
- Reduced flows
- Retreating glaciers
- Hibernation for bears shorter
- Salmon and fish = low productivity
- Vegetation shifts – including yellow cedars which advance north and up
- Habitat loss – changes in habitat – more disturbance to younger
- Habitat loss forces wildlife populations to adapt or move.
- Reduced habitats include wetlands, riparian zones, alpine & old growth forests.

- Areas vacated by deglaciation creates habitat for deer and new vegetation.
- Potential wildfires
- Wetlands and muskegs (35-40% of landscape is wetlands) – lower water tables
- Increased incidence of peat fires = affects habitat, berries
- Changes in wildlife populations, habitat, fisheries
- Tree die off in riparian areas (around streams) from disease, pests, etc., exposes streams to sun, results in warmer stream temperatures = affects fish
- Dying forests create poor salmon and other fish productivity
- Deer population shifts
- Loss of glaciers – in 20 years, Tracy Arm will not have glaciers, but Glacier Bay will still have the tidewater glaciers. Example:: Portage Glacier = huge visitor's center built, but now you can't see the glacier from the visitor's center!
- Biomass productivity? (logging?)

Issues Facing Management:

- Pressure to reduce the size of federal government will force consolidation of agencies and less capacity overall (what they refer to as “streamlining”). Also, as agencies merge, potential for merging disparate interests = institutional chaos, inability to manage climate change. Administrative distraction...
 - e.g. fisheries: FWS, NOAA
 - e.g. climate: USGS, NWS
- Competition for fish resources between commercial fishing, sport fishing, and subsistence needs intensifies.
- Agencies and communities need to adapt to changing tourism patterns/demands. Shifting tourism ... NPS is a tourism agency.
- Lack of education about science, environment, climate change.
- Impacts of loss of subsistence means and TEK. Loss of native culture.**
- Fuel costs and economic conditions produce challenges for Alaska ferry system. (SE transportation plan).

2. Disaster Zone in Big Problems, Big Solutions

- More and more annual disasters are striking SE AK, and govt and people are working together to deal with major issues and to find and coordinate responses.
- Community health and economic health are both emphasized, meaning not just solutions such as starting a hatchery, but also finding holistic solutions to maintain ways of life.
- If fisheries and forestry are lost, what is replacing them? Sustainable tourism? Selective logging? Renewable energy, Biomass? Tidal? Wind? Geothermal? Hydro? All these resources are so close together, it's unusual.
- Individuals all feel interdependence and feel their important role in the communities.
- Seasonal crop failures balanced by other crops – shifting resources rather than eliminated.

- A combination of fire and floods destroy the cultural resources in Skagway and it becomes a ghost town and a more remotely managed park
- 50% of the small communities have to evacuate due to natural disasters, and are reabsorbed into other communities.
- Management faces infrastructure upgrades, need to be more disaster resistant
- Collapse of commercial fishery
- Reduced potable water availability
- Loss of life – or shifting from death from social ills to death via disaster.
- Transportation disruptions with ferries, airports.
- Energy, buildings, waste disposal, social health networks, communications
- Willingness and ability to create and pay for engineered solutions, eg hatcheries
- Mariculture?
- Logging out the dead trees, but planting something that matches new ecosystem conditions
- Decide how to switch from wilderness to more managed areas mixed with areas of dynamic change
- Parks are now managed for different resources. There used to be glaciers in Yosemite, but people still go there. Different visitor experience is being managed in different parks – to see new energy sources, to see glaciers in Wrangell St Elias., from soft adventure to extreme adventure.
- More flightseeing to see reduced glaciers
- Major shifts in habitats, species, and tourism. Recolonization by willow in deglaciated areas, attracts moose and deer. Forest becomes grassland of engineered forests. Might attract elk, bison, grouse. Mountain goats and other species more higher.
- Health emergencies help spark adaptations and change.
- Reduction in timber productivity
- Invasive species that may wipe out local species, in addition to more benign range shift.

DAY THREE

Narrative presentations

Marine Group:

Chaos Scenario in Riots and Revolutions

This group chose to tell the story through a series of Facebook posts. In the story a marine reserve was established and new technologies (jetpacks) were used. There was an additional post about aquaculture in waters adjoining the park and responses from community members. Another post discussed ice harvest and its impact on seals, emergency response and safety.

➔ Jeff Mow and Tahzay Jones (see Jeff Mow's email)

Bad News in Big Problems, Big Solutions

Feb. 2030 – 4th Regional Climate Change Scenario Planning Workshop for
SE AK

Juneau, AK Centennial Hall – 255 attendees (Public Welcome)
(Notes from the First Day Proceedings)

Theme for Day One: **“You Look Lost – We Can Help”**

8:00am Keynote Panel discussion: “The Next Big Thing”

Panelists: James Balog, First Director, US Department of Reason
Melinda Nelson, Honorable Governor of Alaska,
Ray Wilson, Andy Gambel, and Ed Kuntz, Village elders

This spirited discussion outlined the current plans about to be finalized for an innovative regional distribution network serving all of SE Alaska. This multi-partner collaboration should provide transportation and delivery of food, fuel and supplies to communities through the region at lower cost and twice the frequency as present practices. A prime example of the benefits this new agency (analogous to the Homeland Security) is enabling through coordination of federal, state, local gov't, businesses and NGOs.



10:30am: Progress update – Habitat Restoration Projects

Presenters: Regional Subcommittee for Habitat Integrity

As you know, salmon fisheries and other fish stock are in decline, and in recent years, there has been significant loss in habitat structure. Amongst other things, this subcommittee has been tasked with helping the region's communities develop new

economic and subsistence alternatives. We're happy to report that 90% of the backlog of young growth clearing has been accomplished as of this Spring. Project manager Seth Anderson says that all of the crews have made excellent progress. In addition to providing funding support, agencies have actively engaged the youth in these communities as active agents in increasing and maintaining browse for deer and moose populations – reaping expanded harvests. Seth, who started his career in 2010 as a YCC work leader, noted that agencies have enjoyed high retention of enrollees (many becoming permanent staff) and they are also experiencing a boom of interest in citizen science research activities associated with this project. (Looks like the CCC is alive and well for a new generation.)

Lunch

1:30pm: Special event - The 2030 “Fireside Chat for Climate”

Live Video chat presenting community and tribal leaders from communities across the region – including: Kake, Hydaberg, Klawock, Angoon, Petersburg, Wrangell, Haines, Klukwan, Gustavus, Craig, and many others.

This multimedia event was developed to discuss recent shifts occurring in the region's tourism patterns as a result of changing climate. Recent growth in the package-tour market, coupled with the new larger cruise ships serving the region, provide opportunity to collaborate on new climate-inspired strategies for eco-tourism as well as for interpretive and education products and services. The focus of discussion included a wide range of options: sharing traditional ecological knowledge and expanding opportunities for eco-tourism by villages, embracing newer technologies and mobile devices by growing our products and services around a “personalized” perspective, and addressing the need to raise awareness about the current extreme conditions with key climate-related messages about adaptation strategies and concerns. The session concluded with a region-wide multi-venue rendition of “Alaska's Flag” – the first time ever, we believe!

3:30pm: Progress update – Energy Development and “Greening” Projects

Presenters: Regional Subcommittee for Energy Conservation

Several energy-related efforts have made good progress through this partnership over the past few years. Most notably, significant strides in bringing together communities via the grid have seen completion. Funding has been secured for installation of salt water transmission cables, the Thayer Lake hydro project has been operational since 2020, and there has been a concerted effort to reduce demand while increasing availability during peak periods. All the region's national parks have completed their Climate Friendly Parks Action plans and are making progress towards their reduction targets. Several partners have invested in plug-in hybrids for their fleets, and LEED certification standards are the standards for all new construction.

Finally – The Highlight from the Evening Reception – the 10th annual “Big Black Boot” award presentation to Hoonah for excellence in reducing their community's carbon footprint. The trophy is accompanied by a generous cash incentive, so competition has been fierce for this prize – congratulations to all the nominees!

Terrestrial Group:

Southeast AK Identity Crisis in Is Anyone Out There?

Story told as a children's book about climate change: Ranger Ray and the Raven. Mismatch between historic SE Alaska and current—discussion between raven and ranger—discussion of changes: loss of glaciers, Tlingit movement to Juneau,

➔ See email from Amanda

Disaster Zone in Big Problems, Big Solutions: Best of a Bad Deal

The year is 2030. Young Jennie, aged 16, a resident of a Southeast Alaska village, has travelled to Washington D.C. as part of the well-known Closeup program. There she is meeting with Representative B. Gladd, Senator I. M. Responsive, and Senator U. R. Adaptive. Below is her conversation with B. Gladd.

B. Gladd: I'm so pleased to be meeting a young lady from your community. The Senators and I have been hearing so much about the efforts you've been making to welcome the folks who had to evacuate when the village of [x] washed away after the last series of river floods. I hope the funding from the Relocation Bill is helping.

Jennie: Thank you, it is – although moving was so hard for a lot of people from [x]. Still, we all knew it was coming. We made plans, built homes, found ways to reconnect with distant family from [x] and to make new connections – so it's not all bad. Besides, a lot of people from [x] helped us out, in the big fire three summers ago, and in the blizzard year, when I was in fourth grade. So it's nice to be able to do something in return.

B. Gladd:

Yes -- you've certainly had a lot of fires, and what with that and the pest outbreaks, we all know the forest industry can't last. Senator Adaptive and I have been talking to the village councils from your area about adaptation strategies.

Jennie:

Oh, I know. I've been taking part in some of those initiatives in school, as part of the Hands-On-Learning program. I'm a tidal energy specialist now! And my cousin Susie is a hydro-power technician. Also, she's teaching me to cure bison hides. We never had bison until grasslands started coming in after the fires. It's pretty tasty. I do miss salmon, though.

B. Gladd:

A hatchery is still a possibility – but only if the local people agree to it, of course. The funding could be channeled to other initiatives as well, such as the redwood plantations.

Jennie:

I don't know. The Councils have been meeting to talk these ideas over. My friends and I go to the meetings – it's part of our school, and the elders like having us there. They say that if we are to plan for the future, we need the future to be in the room. I

know everyone worries about jobs, and about traditions. We've had to change pretty quickly, and that can be hard on people, but we're doing it together, and that helps. There are still some good jobs. My uncle is an interpretive ranger, in the Park.

B. Gladd:

You know, there were people who said the visitors would stop coming, now that the glacier has almost disappeared, but it seems like the Dynamic Change Program that Senator Responsive championed is really working.

Jennie:

Yeah. Visitors used to come to see things that hadn't changed in millennia. Now they come to see things that are disappearing, and new things that are showing up – like the bison, and all the wildflowers, and our combined Geothermal and Wind plant. Pretty soon we'll start selling energy to British Columbia.

B. Gladd:

That's wonderful. I was proud to sponsor the International Intertie to make that power marketable.

Jennie:

It's not the same as the old ways, and sometimes I really wish things hadn't changed so fast. The older people talk a lot about everything they've lost – but they look to the future, too. I guess my people have always adapted, and always will.

Implications and Management Applications

- What are the implications of a scenario? How do we take these stories and get to what management actions to take as a result?
- Doing it on regional scale now, have done on Park scale. Struggle with how to integrate into management decision making.
- History and values embedded in National Parks—what is our job? Managing as natural systems/tourist destinations—how does this change in the face of climate change?
 - Vignettes of primitive America no longer possible
 - What are the important management actions now? At NPS we don't think of our missions evolving very much...
 - Need mgmt tools with different levels of uncertainty and controllability
 - Rehearsal to avoid management surprises
- **Q:** Is it time to revise the Organic Act? **A:** The Organic Act is written very broadly, but it is our adoption of it as an agency that has implemented it as a narrow thing.
- How to be more flexible/more portable in the face of climate change –even with actual structures, buildings, facilities.
- You need to articulate clearly why you won't go over the management lines. A lot of people think those lines can't be crossed – limiting.

- Don—Vail Agenda (1991) = real attempt to involve communities in park mgmt, without the involvement of local communities. I believe without it, the park service is involved with a management of a *virtual reality*. Need to establish rapport with surrounding stakeholders and actors. You'll need to be adaptive with actions and policies. *The idea that parks are insular is counterproductive.**
- Change the current style of management of 20-year forecast “bibles” to more flexible, evolving plans.
- What are the actions that are common to all in terms of managing the parks?

Climate Change Education Partnership (NSF, CSU, NPS, FWS):

Phase 1: What are parks and refuges doing to communicate climate change to the public? How to elevate the discussion in communities as well as to visitors?

- Place-based learning
- “Climate cafes”

Phase 2: How do you implement what you found out about how to get public involved?

- Youth involvement
- Integrate climate change into day camp
- Kenai watershed forum (KWF)

What are the robust/”no regrets” mgmt actions that apply to all of the impacts on your lists? As opposed to “hedging your bets” or “betting the farm” = **“Best Practices” Management Actions Common and Applicable to All Scenarios** = see back of the CC Response Program sheet that Jeff Mow handed out.

Comments/Questions

1) **Research needs:**

- Evaluate your resources and evaluate how your actions are faring.
 - What are you going to track/monitor in order to validate this process?
- 2) Need to weave **administration and budget** into these action/mgmt plans.
- 3) **Education** alone will not change human behavior. –Amanda
- 4) Role of **interpreter** changing from less of a presenter to more of a facilitator of discussion and participation. –John
- 5) Formal approach to **risk assessment** (high end statistics). Basic premise: we all hold the same values, but we weight the values very differently. Value trees ↔ Risks

Implications and Options

Marine Group:

Nested Scenario 1: Clusterflood (Chaos in Riots & Revolution)

Management Actions

Natural

- Setting up co-management structures for harvested/non-harvested species (protocol, plan, set thresholds, allocation issues) Working group—what are local challenges? Need to think about transaction costs
- Exploring invasive management options and prioritizing actions
- Proactive planning around aquaculture planning
- Consider designated wilderness in planning
- Increased coordination between agencies/communities/local governments/federal government/state
- Proactive Park level leadership in coordination at a local level

Cultural

- Increased outreach and education to communities
- Risk assessment for vulnerable cultural resources & recovery plan
- Document oral histories and make accessible
- Assessment and management of newly recovered cultural resources

Facilities

- Designing more energy efficient and adaptable infrastructure
- Utilizing renewable energy resources
- Address climate change in new infrastructure development
- Risk assessment of existing infrastructure
- Promoting telecommuting for reduced infrastructure footprint
- Reducing fixed costs for Park

Social & Economic

- Proactive water rights planning
- Participation in the travel industry/travel planning (also research need)
- Explore ongoing value-based decision making or co-learning processes

Interpretation and Education

- Redevelopment of interpretation and education programs
- Need to bring the future to the table
- Interpret changed conditions and values (loss of glaciers)

Visitor Protection

- Increased need for visitor protection resources and communications
- Increased concerns about liability and how to respond (new technology)
- Protecting new cultural/natural resources that are exposed

Research Needs

- River gauging data
- Long term acidification monitoring
- Comprehensive baseline social surveys of skills bank, household income, sharing networks and subsistence with economic indicators (Baseline economic and social surveys with focus on subsistence)
- Infrastructure risk/vulnerability assessment
- TEK in defensible framework
- Monitor either harvest or escapement and ecosystem diversity
- Monitoring primary/secondary productivity

- Presence and distribution of invasives
- Robust atmospheric monitoring in usable form for Park management
- Revisit the vital signs for the Park

Other Issues

- Prioritization with budget constraints
- Increased lawsuit costs
- New risks for visitors and employees

Nested Scenario 2: Bad News Group (Bad News in Big Problem, Big Solutions)

Management Actions

- Biological, manual control of invasives
- CCC investments for resource protection
- Geothermal development
- New fuel, e-tax structure
- Broad collaborative
- Emphasize interdisciplinary skills
- Remote control tourism
- Extreme sports
- Non-consumption ecotourism

Research Needs

- Baseline investment
- Cultural and social science monitoring
- Invasive species detection
- Effective messaging for education
- Teaching scenario planning
- More remote monitoring
- Water is a big deal
- Social cultural data not been collected for a long time
- No coordination between agencies

Terrestrial Group:

Nested Scenario 1: Disasters Mastered (Disaster Zone in Big Problems, Big Solutions)

Natural Resources

- Loss of commercial renewable resources (salmon, timber, ...)
- Loss of low elevation glaciers
- Major ecological shifts
- New species due to range expansion
- Increase in invasive species and decrease in diversity and creates potential health issue
- Increase in forest pests

Cultural Resources

- 1) Historical/Architectural
 - Historical resources damaged or lost
 - Loss of infrastructure (washouts, etc) – communities lost/relocated
- 2) Subsistence
 - Loss of subsistence resources (salmon, berries, ...)
 - New subsistence species/resources (bison, deer, fish, cougar, elk)
 - Loss of seasonal subsistence patterns
 - Failure of community networks

Facilities

- Washouts of transportation
- Loss of potable water
- Shifting and new extraction opportunities
- Shifting in transportation networks, patterns, access
- Need to explore other energy resources
- Change in tourism/marketing

Interpretation and Education

- A need to respond and stay relative
- Need for more emergency response teams
- A need to reframe the way we do interpretation → civic engagement
- Increasing conflicts between user groups as resources decrease
- Different communication efforts (alerts, hazards,...)
- Increased wildlife and human conflicts
- Change in visitor use/permitting/commercial uses

Human Health

- Increased epidemic (West Nile, Malaria, Bird flu, parasites)
- Need for social services, health clinics, health responders...
- Empty cupboards

Important Management Actions?

- Create flexible, integrated disaster response teams
- Increase monitoring to target disaster forecasting
- Build preservation corridors of integrated ecosystems
- Create other corridors, but that requires collaboration with other agencies
- Initiate and leverage citizen science to counterbalance funding losses.
- Stockpile emergency resources in case of disaster.

Research and Information Needs?

- Improved hydrology, water balance forecasting techniques
- Government = effective, transparent, real-time feedback
- Streamline interface with all government agencies
- Look internationally for models of climate change adaptations (Nancy makes the point that climate change concerns vary greatly regionally based on what changes are expected on the landscape.

- Be proactive about managing changes across ecosystems.
- Collaboration & sharing data *across boundaries*.
- Data integration
- Evaluation and feedback.
- Comprehensive inventory of natural disasters at the local level.

Other Issues?

- Cost of new research in economic crisis?
- Increased reliance on increasingly-vulnerable global networks
- Need broad base of low-tech solutions as well as high-tech solutions

Nested Scenario 2: Denial Daze (Southeast Identity Crisis in Is Anyone Out There?)

Natural Resources

- Increased berry production
- Salmon reduction
- Sedimentation stream/riverbeds
- Receding glaciers
- Shifting balance of muskegs

Cultural Resources

- Erosion of traditional sites
- Sub conflicts over wildlife uses
- Sub impacts = conflicts over regulations
- Timing of fish runs/bird migrations off
- Longer season for hiking trail use

Facilities

- Potential ice dam releases, flooding facilities
- Innovation in modes of tourism
- Primary visitor attractions diminish

Interpretation and Education

- Continued disconnection of people from nature
- Continued ...?
- Lower water volume = conflicts bw subsistence and recreational uses

Important Management Actions?

- Assess the need for fire and flood plans
- Mitigate natural degraded habitat
- Increased collaboration between tribes and government
- Refer to climate change when making plans
- Emergency op plans for fire, glaciers, fjords, ...
- Proactively protect, e.g., roads/trails away from sensitive spots
- Reduce cost by more energy-efficient utilities/opportunities
- Revitalize programs to cover recreation shoulder seasons
- Vulnerability assessments for culturally-sensitive sites

- Monitor stream flow, forest health, glacier positions/mass, monitor land cover change
- Risk assessment for glacial outburst floods and emergency planning
- Conduct culturally-sensitive subsistence harvest surveys to ensure access
- Raise awareness at a local level of climate change impacts, community forums
- AFE Southeast
- Adjust regulations to address sub needs, seasons, bag limits
- Evaluate capacity to adjust to changing demands

Common Issues:

- TEK in planning
- Co-management
- Invasive management
- Cooperation at local level
- Budget issues
- Value-based management
 - How to make hard decisions?
 - Values are changing—need a transparent decision process

Discussion:

- Planning for emergencies and disasters
 - Vulnerability and risk assessments (cultural resources/infrastructure)
 - Emergency preparedness teams
- Staff with multi-interdisciplinary skills
- Many types of monitoring
 - Importance of water monitoring and stream flow
- Parks as living laboratories
 - Potential problems with wilderness areas
- Collaborative process: fact that communities are at the table
 - Can tell which are from the communities/which from the parks—community perspective is important
 - Appreciate getting people to the table
 - Cultures are represented on the table—maybe they will be more integrated eventually
 - Need communities to be able to provide direction
 - Problem with rules and redtape
 - Partnerships are going to be a bigger issue
 - Need to develop deep relationships and build trust
- Importance of place-based education and collaboration between groups
- Value-based decision-making
 - MMS: used process—brief conversations with stakeholders with interest in decision-making. Tried to elicit “value tree” and trees had the same values with different weights. Iterate values through alternatives that represent values of communities.

- In legislation—document what is supposed to be preserved for each park (see ANILCA)
- No regrets actions might not be enough if trending in one direction
- Social impacts are important—are people prepared—how can we engage them in the process?
 - Have we captured this?
 - Involve communities, consider their values
 - More language and implementing of what the culture in SE AK means—importance of subsistence lifestyle-how to integrate? Unique to here.
 - Rely heavily on other communities—interconnected
 - Perhaps the networks are driven by the place where they are embedded.
 - Are all the stakeholders here?
 - Missing: tourism industry (which industry), fisheries?, logging?, ATIA (Alaska Tourism), other landowners in AK (SeaAlaska, tribal groups, etc.), Parks Canada, climatologist... list can get really large. How do you do this?
 - ½ Park, ¼ other agencies, ¼ community members—about a dozen different disciplines. Dynamic participation. ¼ from community is mixed: native communities, tourism/recreation, others...
 - List of participants with email addresses on the website so that folks can connect
 - Local interagency collaboration and more of the right people would be in the room at a local setting—figure out a tool that fits
 - Success for state agencies: invited to all workshops and so far no state people have come
 - NPS restricted in ability to do surveys/assess values/etc...

DAY FOUR

WHERE DO WE GO FROM HERE?

What are we trying to accomplish and how are we going to accomplish it?

- Make informed decisions with the least regrets possible.
- This is a process – we are trying to develop as a tool to help our thinking.
- Secretarial Order since 2010 for NPS to analyze climate change impacts for long-term planning and decision-making.
- Cultivate dialogue and participation approach versus didactic one-way teaching.

How can we use this?

This depends on you:

- Scenarios and output of scenario planning used as a reference for parks, communities, etc to identify plausible future conditions.
- Should we develop an interactive website just for CCSP???

Keep in mind:

- Desired future conditions have to be tempered with reality = plausible.
- Some resources will change regardless of our efforts.
- NPS' role = “brokers”, not “environmentalists”

Next Steps:

- We will make an attempt to assess this process.
- Keep lines of communication open! Follow-up webinar?

Products:

- Products will be available on the SNAP website—technical report, presentations, ... but what kind of less formal products would you like to see? → 2-page flyer, posters of narratives,
- Final report: notes = week, webinar = 2-3 weeks, feedback, draft report = month or two. Webinar during week of March 5-10?
- **Q:** The last few days have been more about the process/approach and less about actual outcomes for specific parks. One key tool would be to provide a concise, readable manual on the process. Much more encouraged by this approach coming out of it than I was coming into it. I was a non-believer coming into it. The dissatisfying part of where we are right now, is that we know the extent that it can succeed, but we need the right tools to utilize it. Trying to apply this step-wise process later on (scaled down) would be difficult without guidelines. + Templates for applying this process on a smaller scale.
- **A:** Don Weeks – there is a manual we've been developing based on 10+ workshops and all of the lessons learned. Primary authors = Matt Rose, and Jonathan Starr (GBN), reviewed by CCSP training team. Final steps... should be ready in the next month.

- Kris—we used SNAP projections to develop a 2-page CC brochure for Glacier Bay last summer, it was very well received. *Build some useful tools for K-12 teachers to use in the classroom. **
- Develop a comprehensive climate change curriculum for Alaska parks. These can include these narratives and stories, but we need to be careful that those narratives are accompanied by information, or they can be misperceived as a projection (rather than a scenario).
- Educational outreach effort from UAF/SNAP?? [See USGCRP cc curriculum = globalchange.gov, CSC/LCC is making an effort too].
- Downsize powerpoint presentations for tribal councils or governments to use. – Leilani Focused on how climate change will affect the culture.
- Seems like we're trying to sell a huge program
- Baseline information... (Pew research, climate change = to see attitudes about climate change).

CLOSING THOUGHTS/FEEDBACK

What can we do?

- In the big picture, what we can do as individuals is small. In the NEPA context, we consider effects as cumulative.
- Scenaric thinking, as “what if” questions, long-term thinking, even for “small” decisions.
- Need to consider climate to make informed decisions and take *informed* risks.
- Consider climate change in value analysis and developing alternatives.
- We can use this scenario planning *right now*.
- Move away from finger-pointing and learn how to talk to each target audience about scenario planning (Jeff suggests using corporate examples of scenario planning.)
- Move away from mitigation and focus on adaptation to changes that are already happening. –Leilani
- Elevate examples of success, examples of application when ‘selling’ cc scenario planning process. We are all ambassadors to take this information back to our communities and agencies.
- Create a facebook page for NPS CCSP! But who?
- Too many different workshops and programs with a similar goal? Will that make our voice weak if too spread out?
- Story needs to be repeated, but need to be careful that the story is the same. If stories have conflicting information, could be counterproductive. You'll get very different stories at different scales, but we shouldn't see that as a threat to the overall message –Corrie. Present how you got to those stories, and then present the stories themselves.
- Need to COORDINATE. How to incorporate and keep this same message. Build in the continuity by having the same people attend the same variety of meetings/workshops.
- Get artists involved? Art, theater, music to incorporate these narratives.

- Amanda— Maybe each one could just be seen as a different stakeholder viewpoint, that together creates a basis of a broad base of viewpoints. Values slightly different, viewpoints different = same message.
- Brendan— Apply same idea as what we've done here, have different groups come to conclusions and then find commonality between those outcomes. What we did here needs to keep growing. NPS represents a large group of stakeholders, so it's important to hear all of their views.
- We are all concerned about the same basic issues/values and have common goals.

FINAL FINAL COMMENTS

- Why aren't things happening faster?
- Stay positive and hopeful.
- "I don't believe in hope without endeavor." –John's quote from Ahn Sang Su Chi. Cannot hope for change unless we're willing to step up and make it so.